Figure 1

Mechanism

$$Mn(III)TMPyP + O_2^{\cdot} \rightarrow Mn(II)TMPyP + O_2$$

$$Mn(II)TMPyP + O_2^{\cdot} + 2H^{+} \rightarrow Mn(III)TMPyP + H_2O_2$$

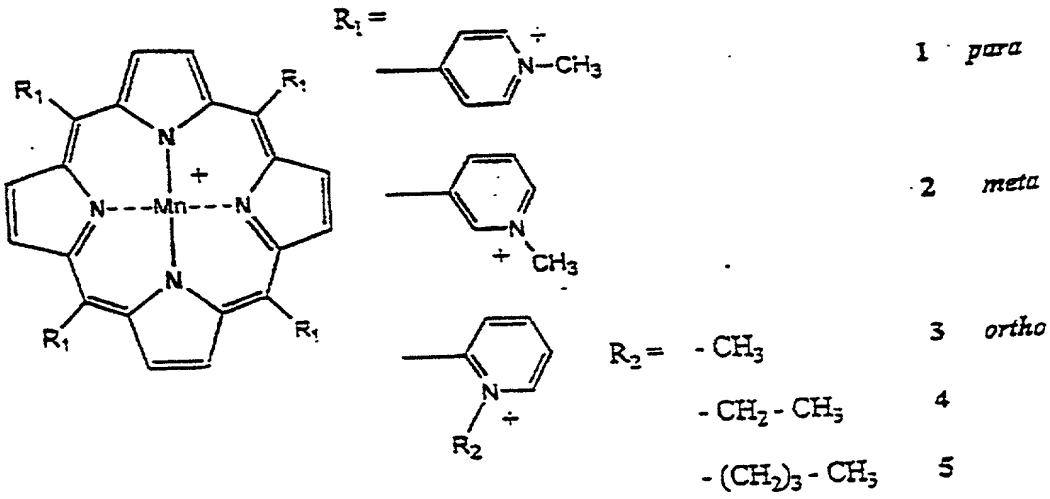
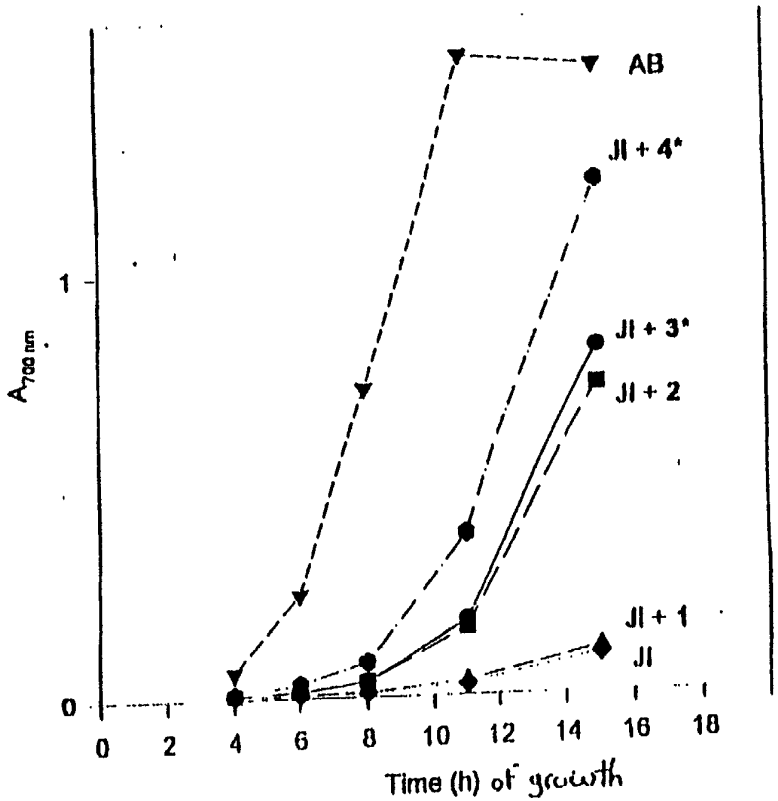


Figure 2. Manganese *meso*-tetraKis —*N*-alkyl-pyridinium based porphyrins



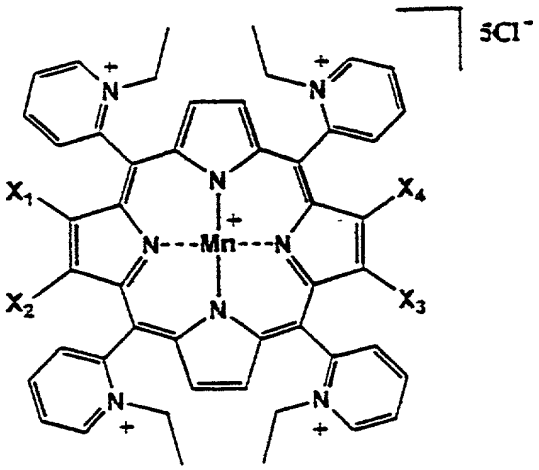
4 = ethyl version

3 = methyl in ortho position

2 = methyl in meta position

1 = methyl in para position.

Figure 3 SOD activity in *vivo* (*E. coli*) of 1, 2, 3* and 4* (25 μM) in minimal medium (*mixture of atropisomers, JI = SODs defficient strain, AB = parental strain).



MnTE-2-PyP^{5+}	$X_1=X_2=X_3=X_4=H$
$MnCl_1$TE-2-PyP^{5+}	$X_1=Cl$, $X_2=X_3=X_4=H$
$MnCl_{2a}$TE-2-PyP^{5+}	$X_1=X_2=Cl$, $X_3=X_4=H$
$MnCl_3$TE-2-PyP^{5+}	$X_1=X_2=X_3=Cl$, $X_4=H$
$MnCl_4$TE-2-PyP^{5+}	$X_1=X_2=X_3=X_4=Cl$

Figure 4

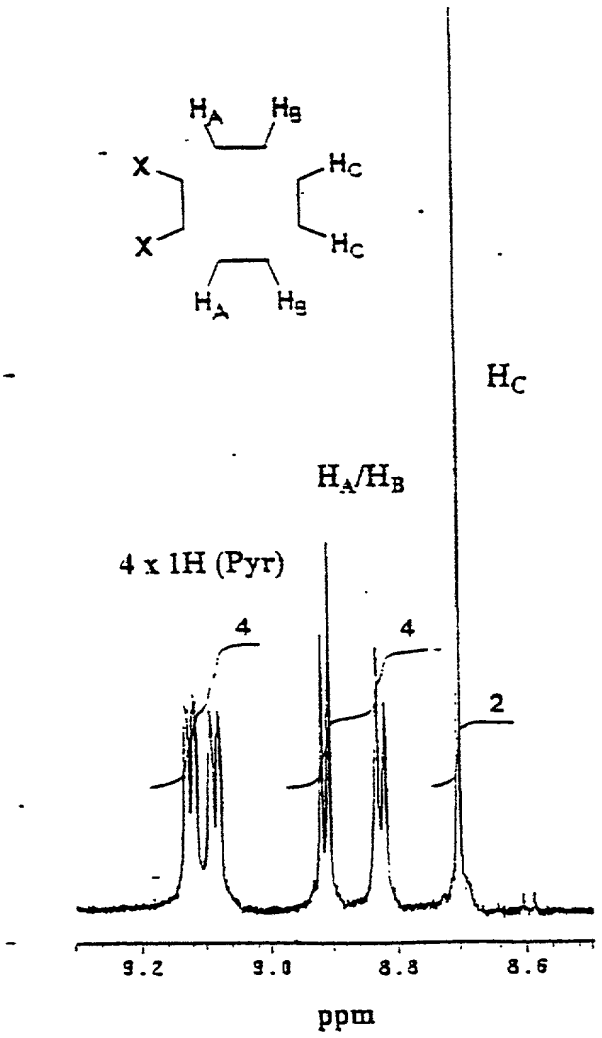


Figure 5

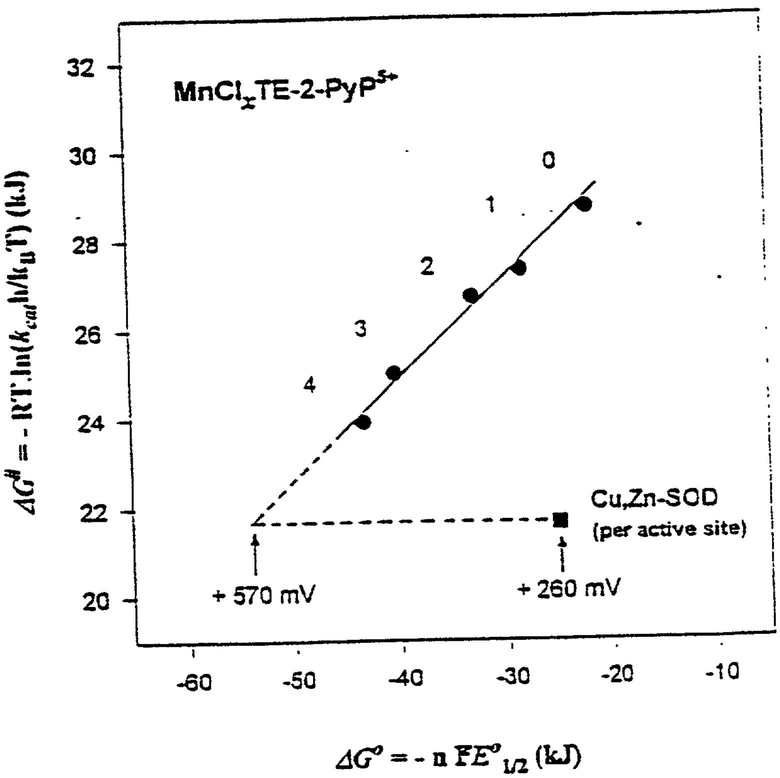
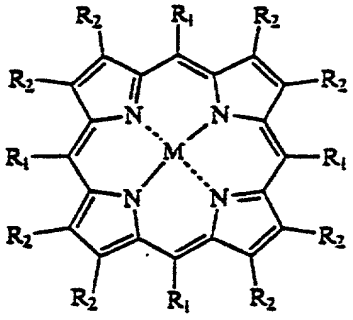
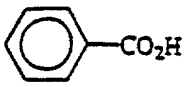
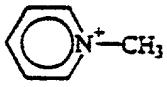
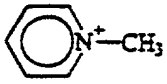
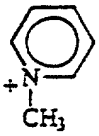


Figure 6

A

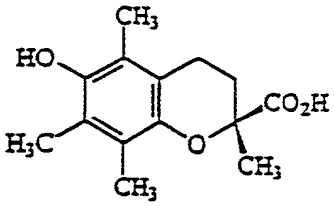


M= $Mn^{+2/+3}$, $Co^{+2/+3}$, $Fe^{+2/+3}$, or Zn^{+2}

R_1	R_2	
	H	[TBAP]
	H	[TM-4-PyP]
	Br	[OBTM-4-PyP]
	H	[TM-2-PyP]

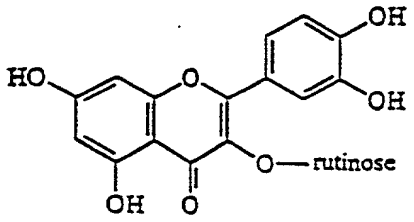
Metalloporphyrins

B



Trolox

C



(+)-Rutin

Figure 7

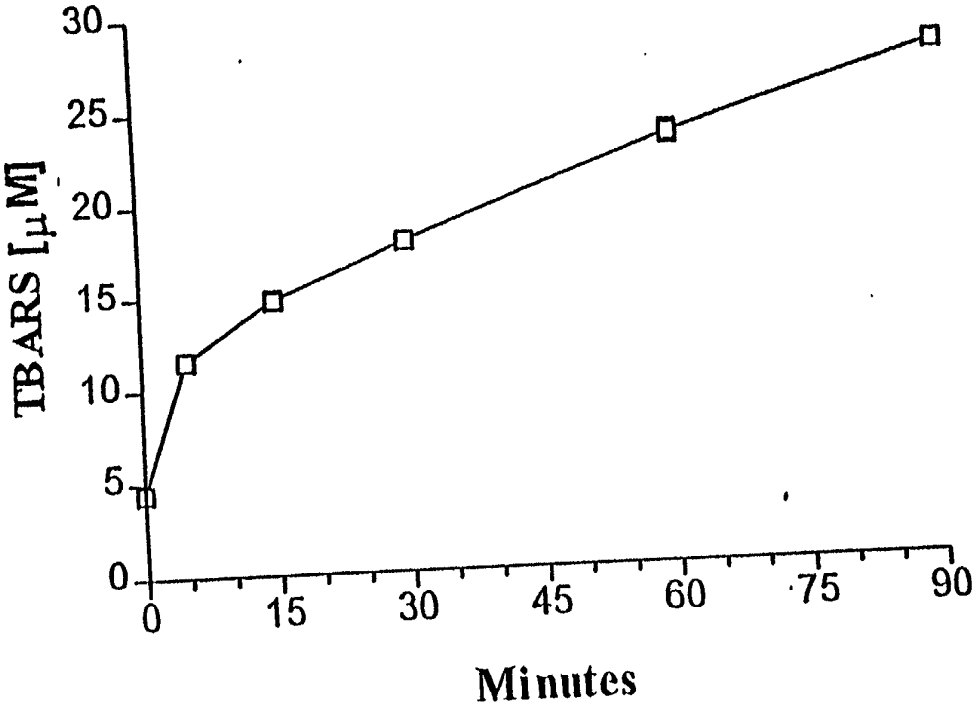


Figure 8

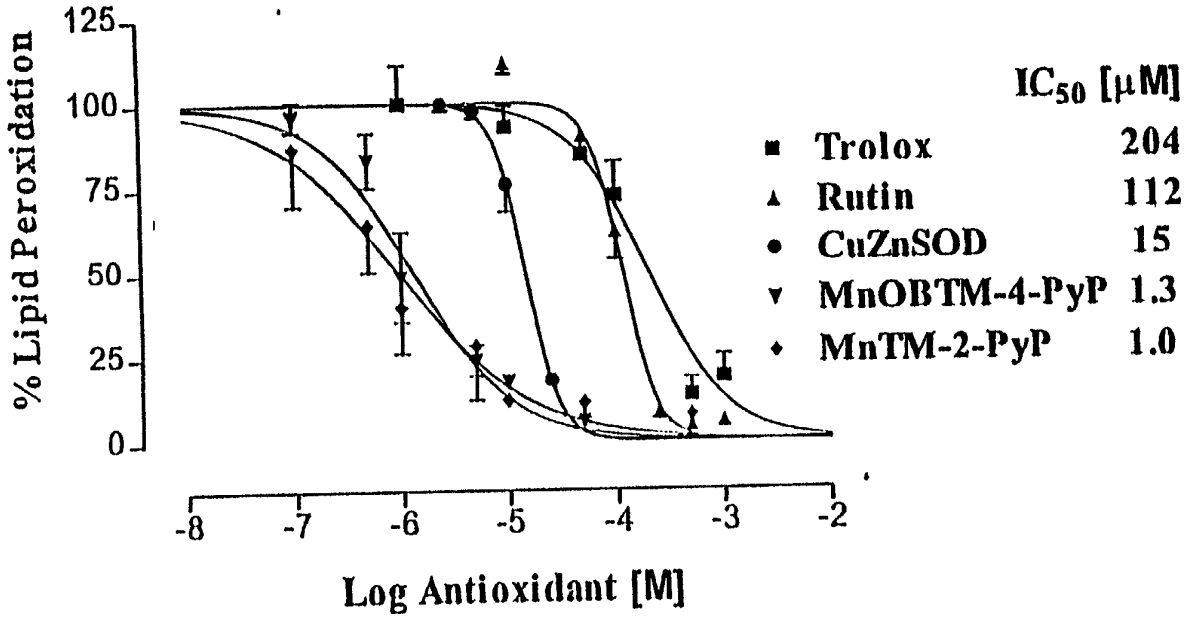

% Lipid Peroxidation
125
100
75
50
25
0
-8
-7
-6
-5
-4
-3
-2
Log Antioxidant [M]
IC50 [μM]
Trolox 204
Rutin 112
CuZnSOD 15
MnOBTM-4-PyP 1.3
MnTM-2-PyP 1.0

Figure 9

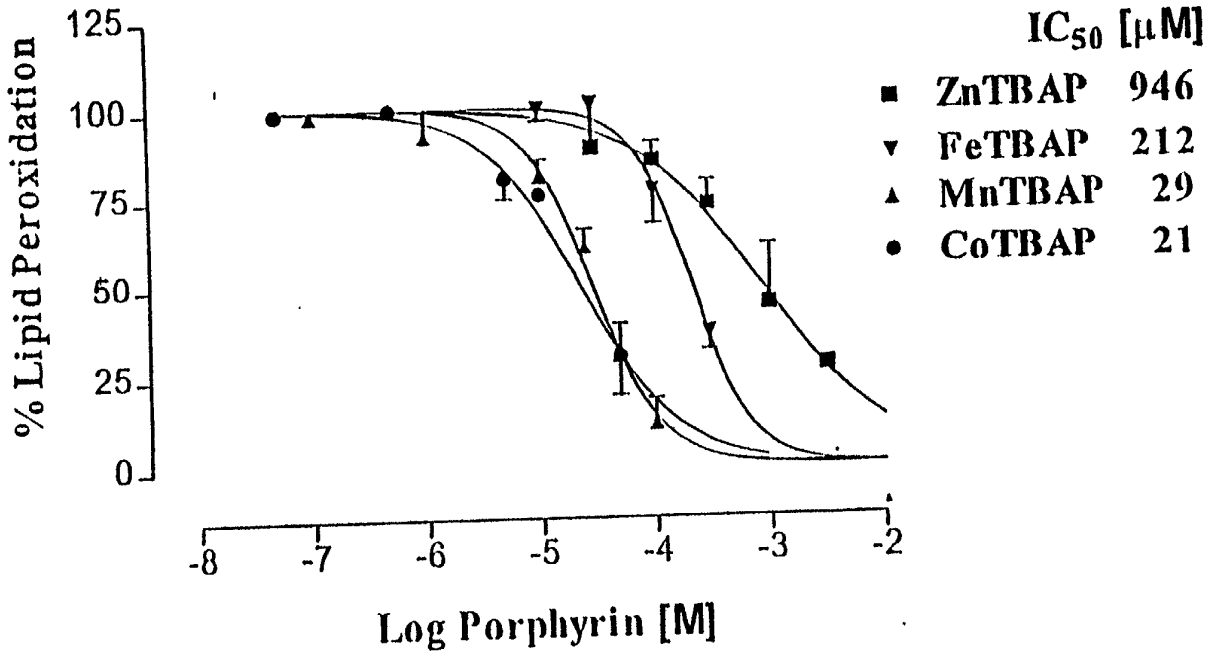

% Lipid Peroxidation
125
100
75
50
25
0
-8
-7
-6
-5
-4
-3
-2
Log Porphyrin [M]
IC50 [μM]
ZnTBAP 946
FeTBAP 212
MnTBAP 29
CoTBAP 21

Figure 10

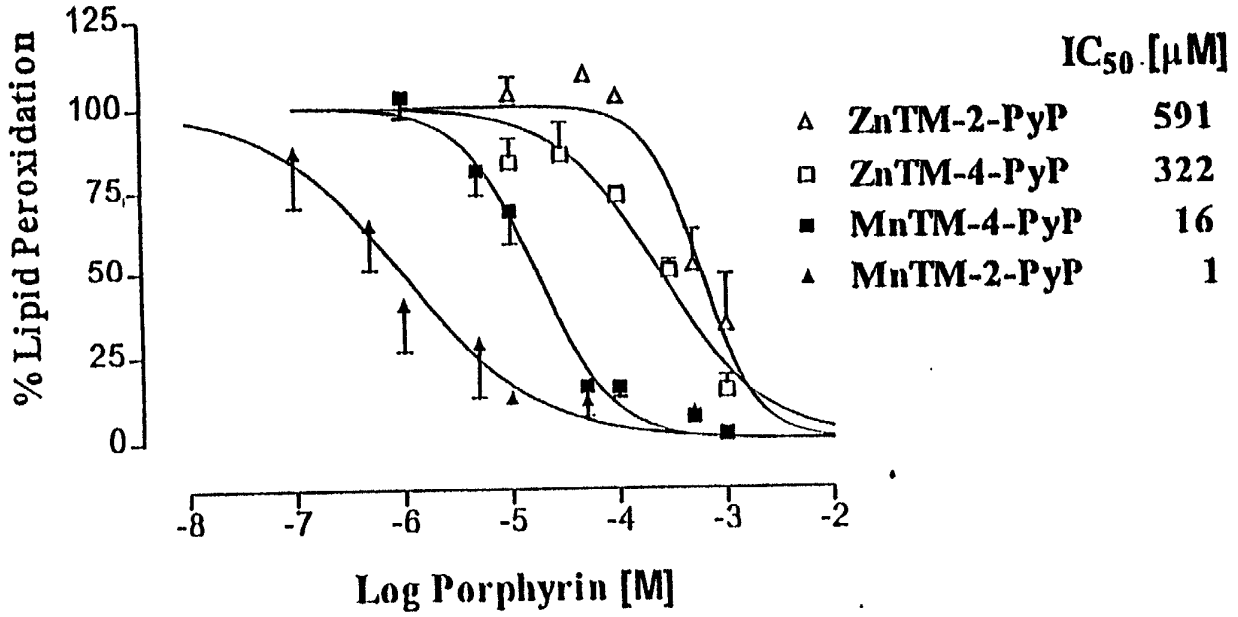

% Lipid Peroxidation
125
100
75
50
25
0
-8
-7
-6
-5
-4
-3
-2
Log Porphyrin [M]
IC50 [μM]
ZnTM-2-PyP 591
ZnTM-4-PyP 322
MnTM-4-PyP 16
MnTM-2-PyP 1

Figure 11